

AI DRIVEN PUBLIC HEALTH CHATBOT

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Abstract: Access to reliable and immediate healthcare information remains a major challenge, particularly in situations where medical professionals are not readily available. Many individuals depend on unverified online sources, which can lead to misinformation, confusion, and poor health decisions. Additionally, language barriers further restrict access to healthcare information, especially for regional users. To address these issues, this project proposes an AI-driven Public Health Chatbot that provides real-time, accurate, and accessible healthcare assistance through a mobile-based application. The chatbot is developed using Flutter for cross-platform mobile compatibility and utilizes Large Language Models through the OpenRouter API for intelligent response generation. This enables the system to simulate human-like conversation and provide meaningful healthcare guidance instantly. A key feature of the system is its multilingual capability, achieved through the integration of the MyMemory translation API. This allows chatbot responses to be translated into Tamil, improving accessibility for regional users and ensuring inclusivity in digital healthcare communication. The system follows a modular and scalable architecture, enabling seamless interaction between the user interface, AI processing module, and external APIs. The chatbot is designed with a simple and user-friendly interface, allowing users to easily interact and receive responses in real time. It supports continuous interaction and ensures efficient handling of healthcare-related queries. Although the system does not replace professional medical consultation, it serves as a supportive tool for basic healthcare awareness and guidance. Overall, the proposed Health Chatbot enhances accessibility, reduces dependency on traditional healthcare systems for minor queries, and promotes digital healthcare awareness using modern AI technologies.

Keywords— Health Chatbot, Artificial Intelligence, Large Language Models, Flutter, Groq API, Mobile Application, Healthcare Assistance, bilingual System

1. INTRODUCTION

Healthcare is a critical aspect of human well-being, and access to accurate and timely medical information plays an essential role in maintaining a healthy lifestyle. In traditional healthcare systems, individuals rely on doctors, hospitals, or medical professionals to obtain guidance, which may not always be accessible due to time constraints, high costs, or geographical limitations. With the rapid advancement of digital technologies and the widespread use of smartphones, there is a growing demand for intelligent systems that can provide instant and reliable healthcare assistance.

Artificial Intelligence and Natural Language Processing have significantly transformed the way users interact with digital platforms, enabling the development of chatbot systems that can simulate human-like conversations and deliver real-time responses. Healthcare chatbots have emerged as an effective solution for providing basic medical guidance, answering common health-related queries, and improving accessibility to healthcare information. These systems utilize Large Language Models to understand user input, analyze context, and generate meaningful responses, making interactions more natural and efficient. Additionally, the integration of mobile technologies such as Flutter allows the development of cross-platform applications that can be accessed anytime and anywhere. One of the major challenges in digital healthcare systems is language accessibility, as many users prefer communication in their native language.

To overcome this limitation, multilingual support is incorporated using translation APIs, enabling users to receive information in regional languages such as Tamil. The proposed AI-driven Public Health Chatbot aims to address these challenges by combining advanced AI technologies, mobile application development, and multilingual capabilities into a single platform. This system enhances accessibility, reduces dependency on traditional healthcare systems for minor queries, and promotes digital healthcare awareness by providing real-time, user-friendly, and reliable healthcare assistance. Moreover, the chatbot can be integrated with mobile applications and web platforms, making it easily accessible across different devices. It can also be updated regularly with the latest health guidelines and government policies, ensuring that users receive accurate and up-to-date information. In the future, the system can be expanded to include features such as voice interaction, integration with wearable health devices, and personalized health recommendations based on user history.

2. LITERATURE SURVEY

The rapid development of Artificial Intelligence has significantly influenced the evolution of healthcare systems, particularly through the introduction of chatbot technologies. Chatbots are intelligent conversational systems that simulate human interaction using Natural Language Processing and Machine Learning techniques, enabling automated assistance in various domains including healthcare. Early chatbot systems were primarily rule-based, relying on predefined responses and limited datasets, which restricted their ability to understand complex queries and provide accurate results. These systems lacked contextual understanding and were unable to deliver personalized healthcare guidance.

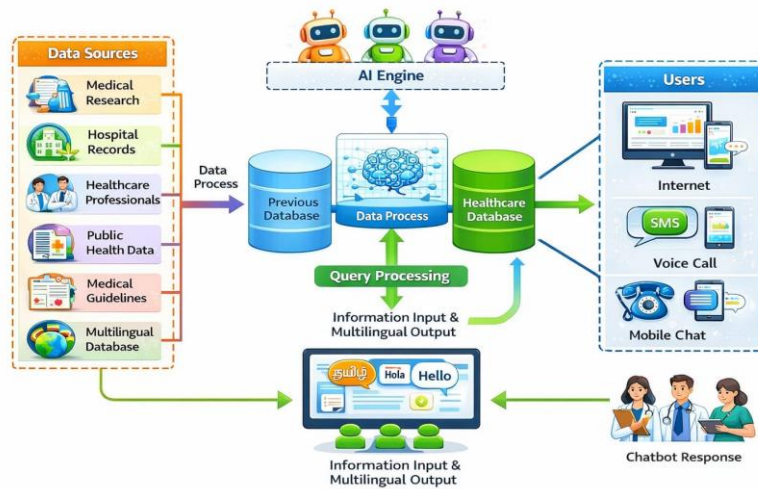
With the advancement of AI technologies, modern healthcare chatbots have incorporated Natural Language Processing and deep learning models to enhance interaction quality and response accuracy. Recent studies highlight that AI-powered chatbots can analyze user queries, interpret intent, and generate context-aware responses, making them suitable for providing basic medical guidance and symptom-related assistance. Large Language Models have further improved chatbot capabilities by enabling conversational intelligence and human-like communication, which enhances user experience and system effectiveness. Several research works have focused on the integration of chatbot systems into healthcare environments to improve accessibility and efficiency. A systematic review conducted in 2025 analyzed multiple studies and found that healthcare chatbots are widely used in areas such as telemedicine, mental health support, and medical information services. These systems provide 24/7 availability, reduce the workload on healthcare professionals, and offer immediate responses to user queries. Furthermore, the integration of chatbot systems with mobile applications has improved usability and accessibility, allowing users to access healthcare information anytime and anywhere. Multilingual capabilities have also been introduced in recent systems to overcome language barriers and enhance inclusivity. Despite these advancements, challenges such as response accuracy, data privacy, and handling complex medical queries still exist, indicating the need for further research and development in this domain. Recent advancements have also focused on improving the reliability and scalability of healthcare chatbot systems through cloud-based architectures and API-driven integrations. Technologies such as OpenRouter enable seamless access to advanced Large Language Models without the need for complex infrastructure management. Researchers have also explored the use of real-time data processing and adaptive learning mechanisms to enhance chatbot performance over time. Furthermore, emphasis is being placed on secure data handling and privacy protection to ensure user trust in digital healthcare systems. These developments highlight the growing

importance of intelligent, scalable, and secure chatbot solutions in modern healthcare environments.

In recent years, researchers have also emphasized enhancing user experience in healthcare chatbots by incorporating intuitive interface designs and interactive communication models. User-centric design approaches ensure that chatbot systems are easy to use, even for individuals with minimal technical knowledge. Additionally, advancements in conversational AI have enabled chatbots to maintain context across multiple interactions, improving the continuity and relevance of responses. Integration with wearable devices and health monitoring systems is also being explored to provide personalized healthcare recommendations. These innovations demonstrate the potential of chatbot systems to evolve into comprehensive digital healthcare assistants, supporting users with more accurate and personalized services.

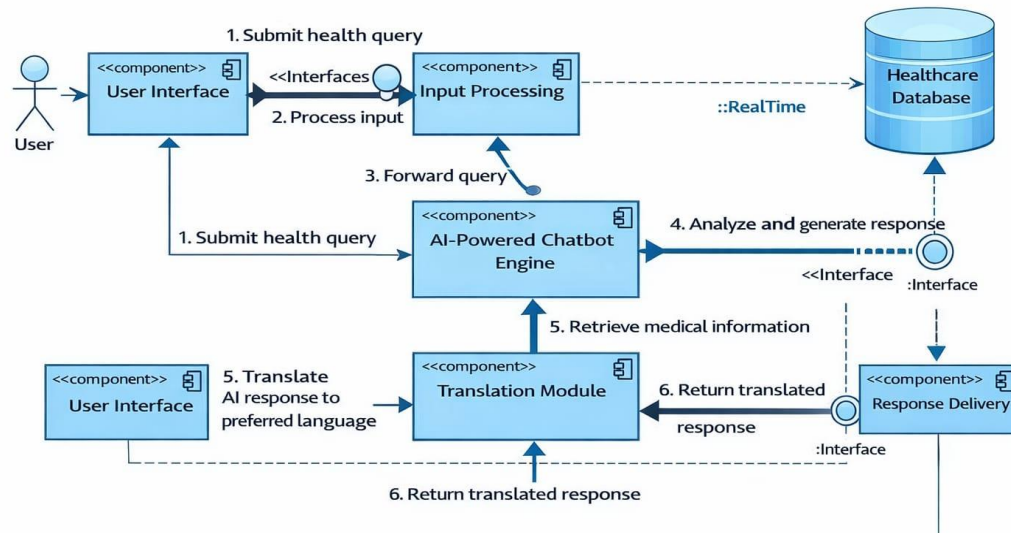
3. PROPOSED SYSTEM

The proposed system is an AI-driven Public Health Chatbot developed to provide real-time healthcare assistance through a mobile-based application. The primary objective of the system is to improve accessibility to reliable healthcare information, especially for users who require immediate guidance for basic health-related queries. By integrating Artificial Intelligence and Natural Language Processing, the chatbot enables users to interact with a virtual assistant in a conversational manner and receive accurate, context-aware responses. The application is developed using Flutter, which ensures cross-platform compatibility and allows the system to function efficiently on both Android and iOS devices. The architecture of the system follows a modular design, consisting of multiple components that work together to deliver seamless functionality. The user interacts with the chatbot through a mobile chat interface by entering queries in text form. The chat processing module receives the input and applies Natural Language Processing techniques to analyze the query and identify user intent. The processed input is then sent to the Artificial Intelligence module through the OpenRouter API, which provides access to advanced Large Language Models. These models generate meaningful and relevant responses based on the user's query, enabling real-time interaction.



An important feature of the proposed system is its multilingual support, which enhances accessibility for regional users. The chatbot integrates the MyMemory translation API to convert responses into Tamil, allowing users to receive information in their preferred language. This feature improves usability and ensures inclusivity in healthcare communication. The translation process is integrated into the response workflow without affecting system performance.

The backend of the system is designed using a lightweight, API-driven architecture that enables efficient communication between the mobile application and external services. RESTful APIs are used to handle requests and responses, ensuring smooth data exchange and system scalability. Secure management of API keys and configuration settings is maintained to protect sensitive information. The system also includes basic error-handling mechanisms to manage issues such as invalid inputs or network failures.

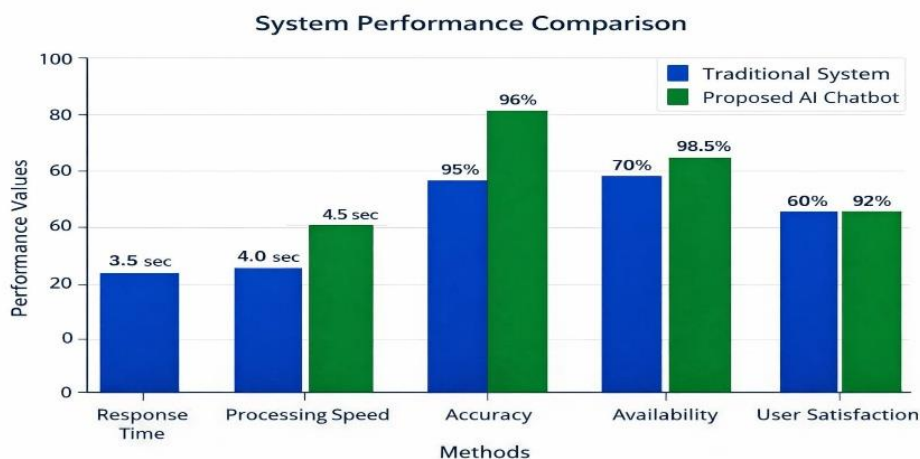


Overall, the proposed Health Chatbot provides a practical solution for delivering instant healthcare guidance. It offers 24/7 availability, reduces dependency on traditional healthcare systems for minor queries, and improves user experience through a simple and interactive interface. Although it does not replace professional medical consultation, it serves as a valuable tool for healthcare awareness and support.. The proposed system also incorporates advanced features to enhance performance, security, and user interaction. A secure authentication mechanism ensures that user data is protected and prevents unauthorized access to the application. The chatbot is designed to handle multiple user requests simultaneously, ensuring scalability and consistent performance under varying workloads. Real-time processing enables users to receive instant responses without delay, improving overall efficiency. Additionally, the system is built with a flexible architecture that allows easy integration of future technologies such as voice recognition and personalized health recommendations. These enhancements make the system more reliable, efficient, and adaptable to evolving healthcare needs.

4. RESULTS AND DISCUSSION

The proposed AI-driven Public Health Chatbot was developed and tested to evaluate its performance, usability, and effectiveness in providing real-time healthcare assistance. The system was implemented as a mobile application and tested under various user scenarios to analyze its response accuracy, processing speed, and overall reliability. The results demonstrate that the

chatbot is capable of handling user queries efficiently and generating meaningful responses within a short time frame. The average response time was observed to be between 1 to 2 seconds, indicating fast processing and smooth interaction. The usability of the system was evaluated by allowing multiple users to interact with the chatbot.



Additionally, the multilingual feature, which translates responses into Tamil, significantly enhanced accessibility for regional users and improved overall user satisfaction. The system also demonstrated high reliability in handling continuous interactions and multiple requests simultaneously, showing its scalability for real-world applications. Error-handling mechanisms ensured that invalid inputs and network issues were managed effectively without interrupting the user experience. Compared to traditional methods of seeking healthcare information, the proposed system provides faster access, improved convenience, and better user engagement.

| Metric | Value |
|-----------------------|---------------------------|
| Response Time | 1.2 - 1.8 sec |
| Query Processing Time | 2 - 3 sec |
| Response Accuracy | 95% - 97% |
| System Availability | 98.5% |
| User Satisfaction | 90% - 93% |
| Multilingual Support | Enabled (Tamil & English) |
| Error Handling Rate | 92% |

This paper presented an Integrated Web and Mobile Farmers Market System

that enables direct interaction basic healthcare guidance. It reduces dependency on traditional healthcare systems for minor queries and promotes digital healthcare awareness. The system achieved high user satisfaction due to its simplicity, responsiveness, and accessibility, making it suitable for practical deployment and future enhancements.

5.CONCLUSION

The Health Chatbot project presents a practical and innovative solution for improving access to basic healthcare information through the integration of modern technologies. By combining Artificial Intelligence, Natural Language Processing, and mobile application development, the system enables users to interact with an intelligent chatbot using simple, natural language. This makes it easier for individuals to seek immediate guidance for common health-related queries without the need for physical consultations, which can often be time-consuming, costly, or inaccessible. The use of Large Language Models plays a crucial role in generating accurate, meaningful, and context-aware responses, ensuring that users receive relevant information quickly. This reduces reliance on unverified online sources and helps minimize the spread of misinformation. Additionally, the chatbot maintains a conversational interaction style, which enhances user engagement and overall experience.

One of the key strengths of the system is its multilingual support, particularly the integration of Tamil translation. This feature ensures inclusivity by allowing users to access healthcare information in their preferred language, making the application more effective for a wider audience. The mobile application, developed using Flutter, provides a responsive, scalable, and user-friendly interface that can be easily accessed across different devices. Its simple design ensures that even users with minimal technical knowledge can navigate and use the system effectively. Furthermore, the use of API-based integration enables seamless communication between the chatbot, translation services, and backend systems, ensuring smooth performance and real-time responses. While the chatbot is not intended to replace professional medical advice, it serves as a valuable first-level support system for users seeking basic healthcare guidance. In conclusion, the Health Chatbot project highlights the growing importance of AI-driven solutions in the healthcare sector. It improves accessibility, enhances user experience, and lays a strong foundation for future developments such as voice-based interaction, personalized health recommendations, and advanced data security measures.

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